

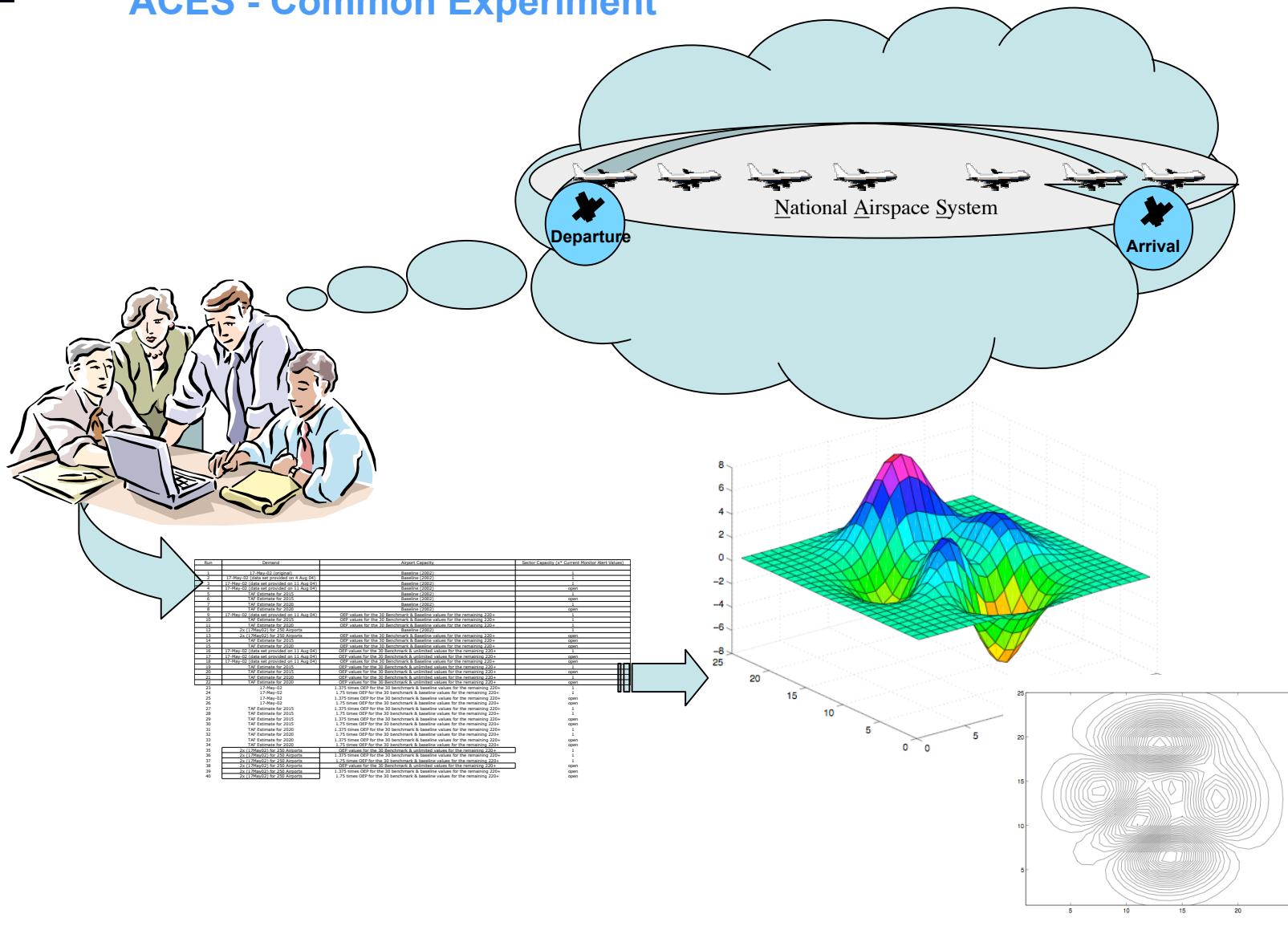


ACES Common Experiment

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ACES - Common Experiment

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Common Experiment

- **Origin**
- **Objectives**
- **Schedule**

Origin:

- **Two needs have arisen in the VAMS Project**
 - Understanding the non-linear relationship between flight demand and NAS capacity (i.e. Network Sensitivity)
 - Concept Developers need common “baseline” data sets for evaluation of their concepts
- **NASA to provide simulations**
 - Computational requirements exceed Concept Developers resources
 - Duplication of effort eliminated
 - Ensures common data sets for ongoing and future studies
- **External Participants**
 - Boeing
 - Metron Aviation
 - Optimal Sythesis
 - Seagull
 - Raytheon

Objectives: Generate sufficient data to provide baseline data sets and investigate non-linear behavior of the NAS.

All done assuming Visual Meteorological Conditions

- **Initial demand variation**
 - May 17, 2002 flight data set
 - Terminal Area Forecast 2015
 - Terminal Area Forecast 2020
 - Twice demand of May 17, 2002
- **Initial capacity variation**
 - Capacity on May 17, 2002
 - OEP predicted capacities
 - 1.375 and 1.75 times OEG capacities
 - Limitations of sector monitor alert values

Schedule:

- **First phase of investigation**
 - 68 Runs
 - 3 Strings
 - 39 Hours of “Configuration”, 1166 Hours 12 Minutes 56 Seconds “Run” time
- **Second phase**
 - Add 6 weather days. Now includes VMC, IMC, and Marginal VMC.
(Provided by Metron Aviation)
 - Capacity Data updates from new Benchmark Study (Due from FAA by Sept 16, 2004)
 - Increment to ACES Build 3.x
 - Ties initial investigation to current build version of ACES
 - Increases modeling and fidelity to improve the capture of non-linear effects
 - Annualized data for computed benefits
- **Extract metrics and extend process as needed**



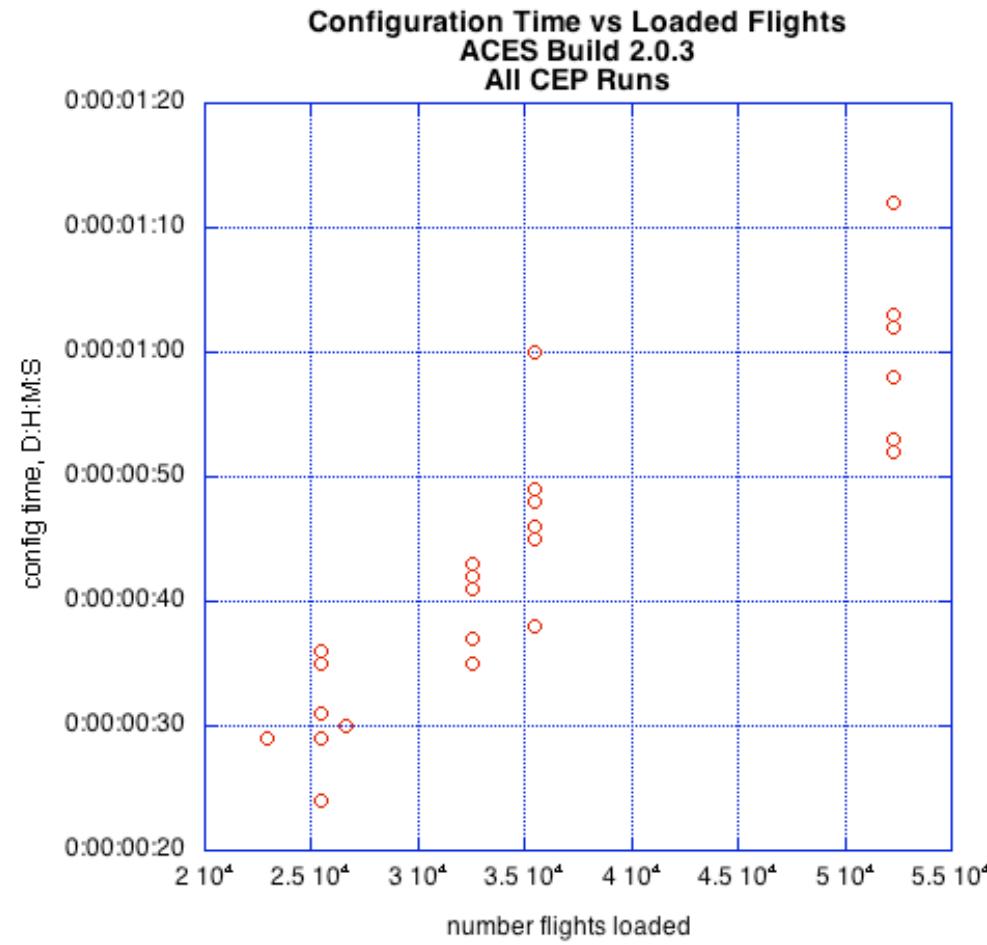
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Initial Results



Cost to Compute

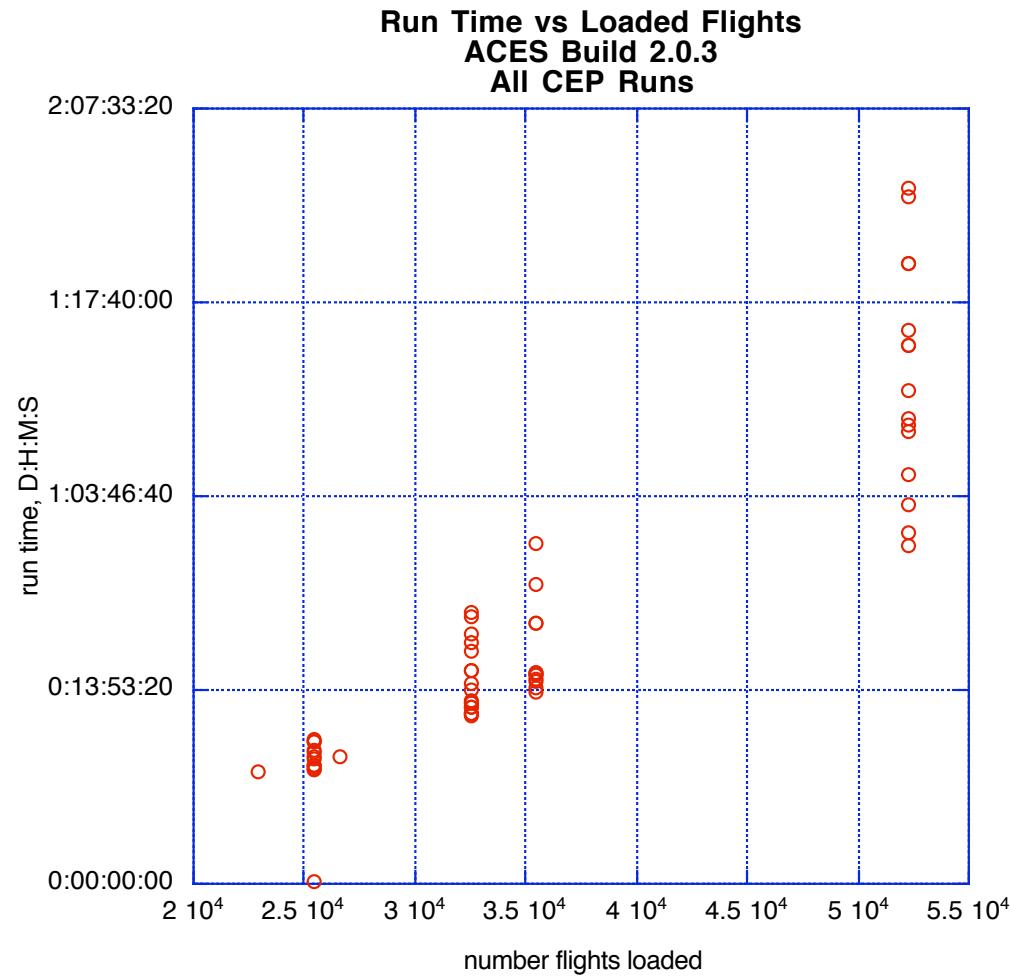
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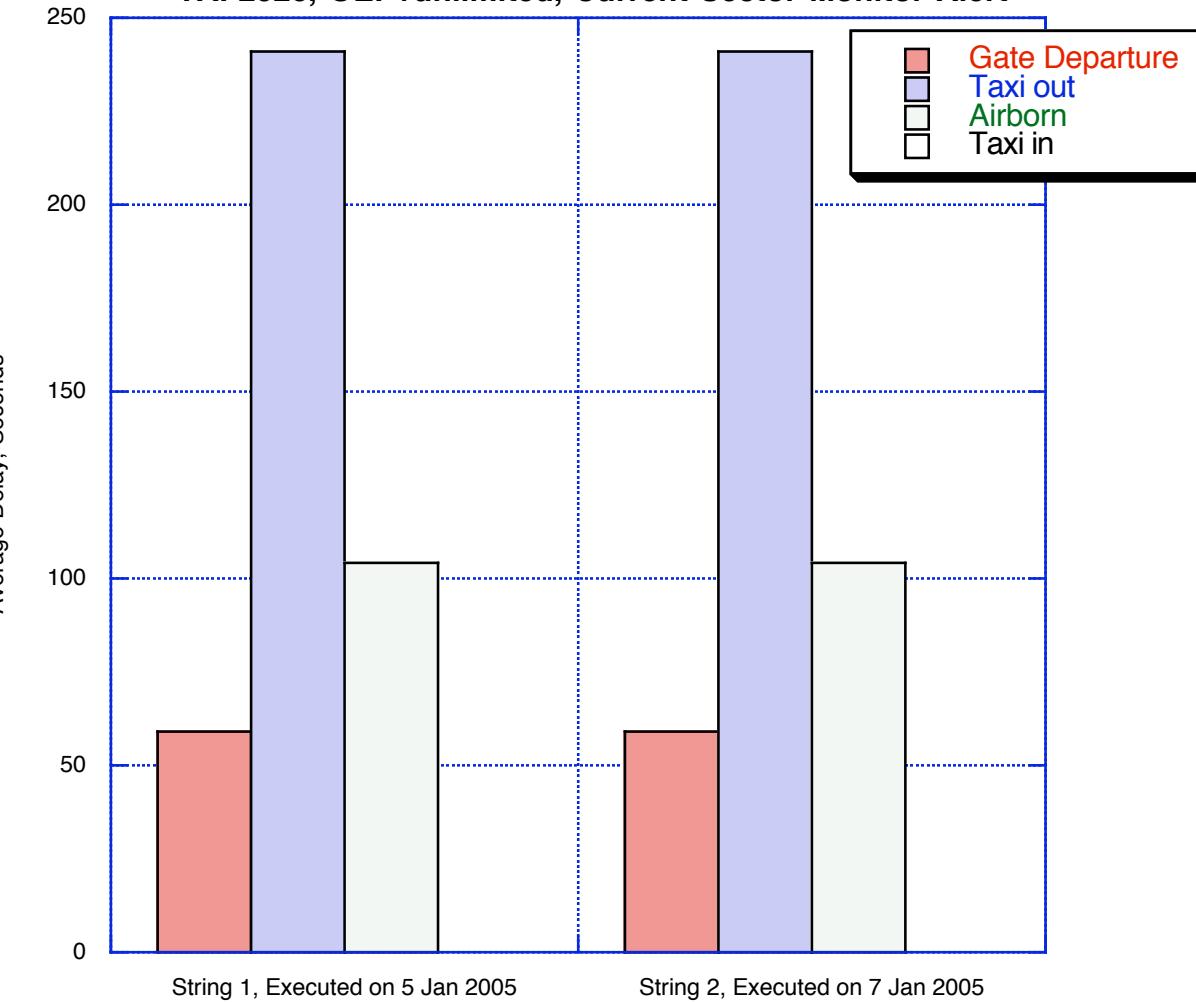
Cost to Compute

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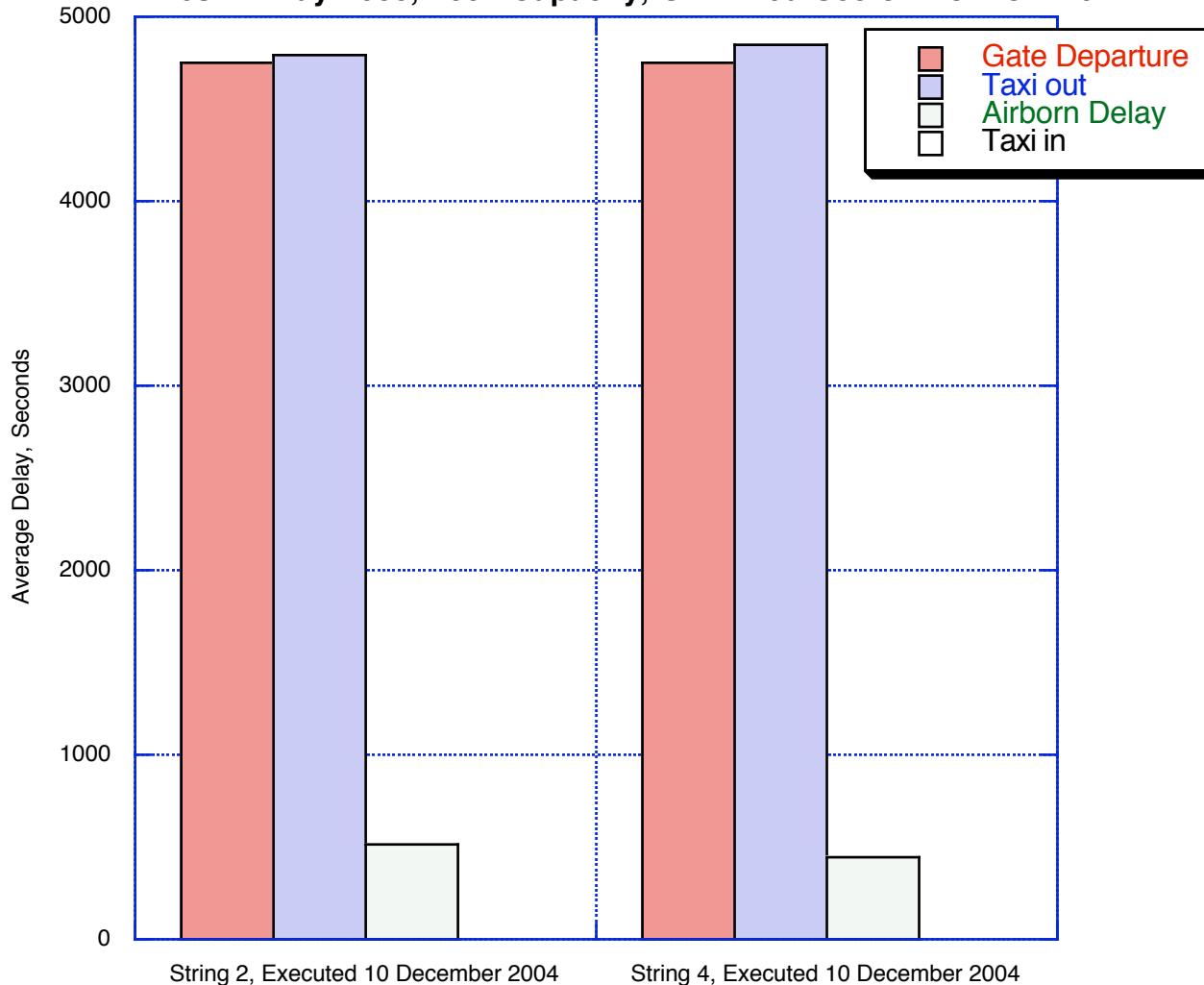
Repeatability

String1 to String 2 Repeatability Effects on Average Delays
 TAF2020, OEP+unlimited, Current Sector Monitor Alert



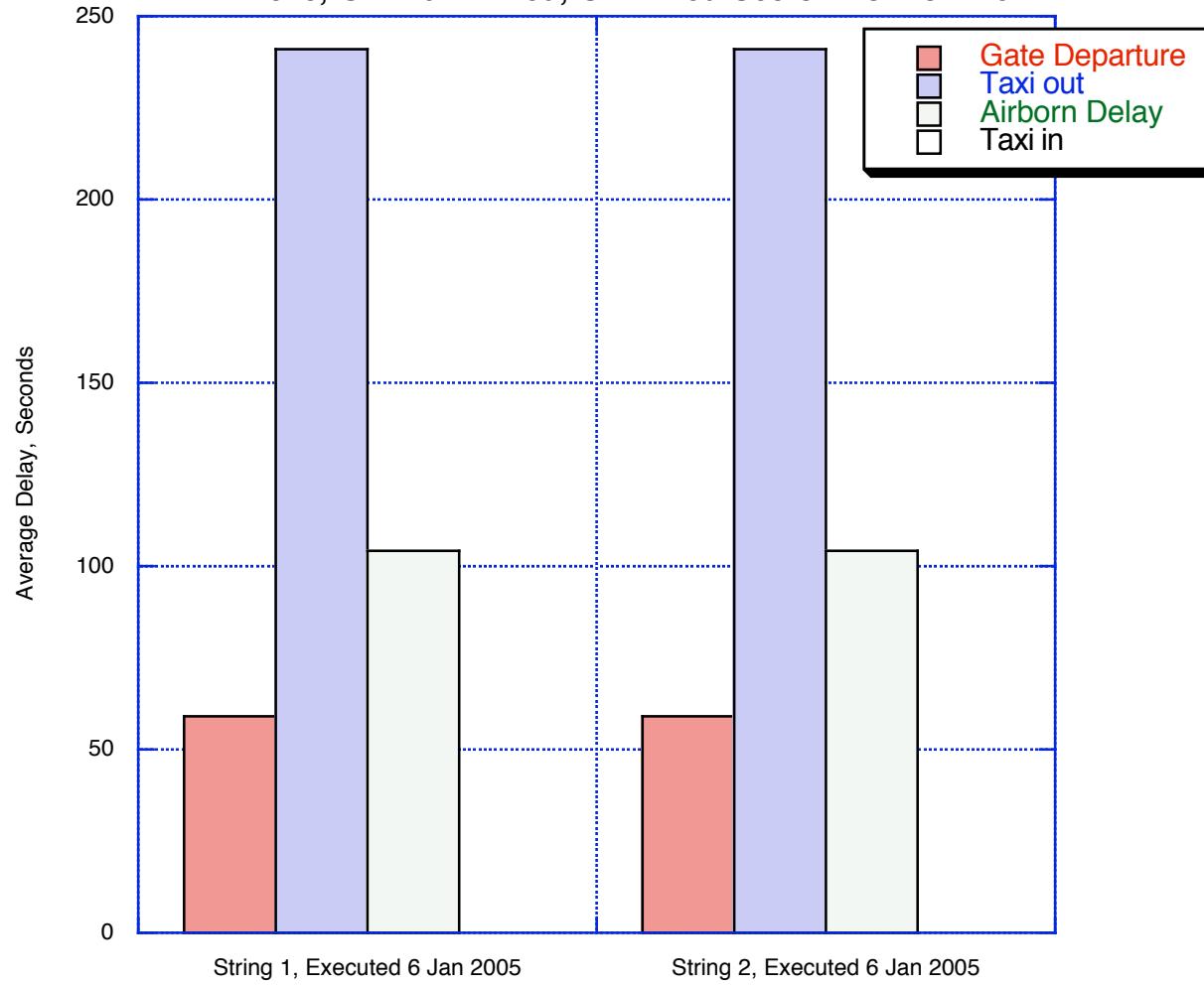
Repeatability

String2 to String 4 Repeatability Effects on Average Delays
 2Times 17 May 2005, 2002 Capacity, Unlimited Sector Monitor Alert

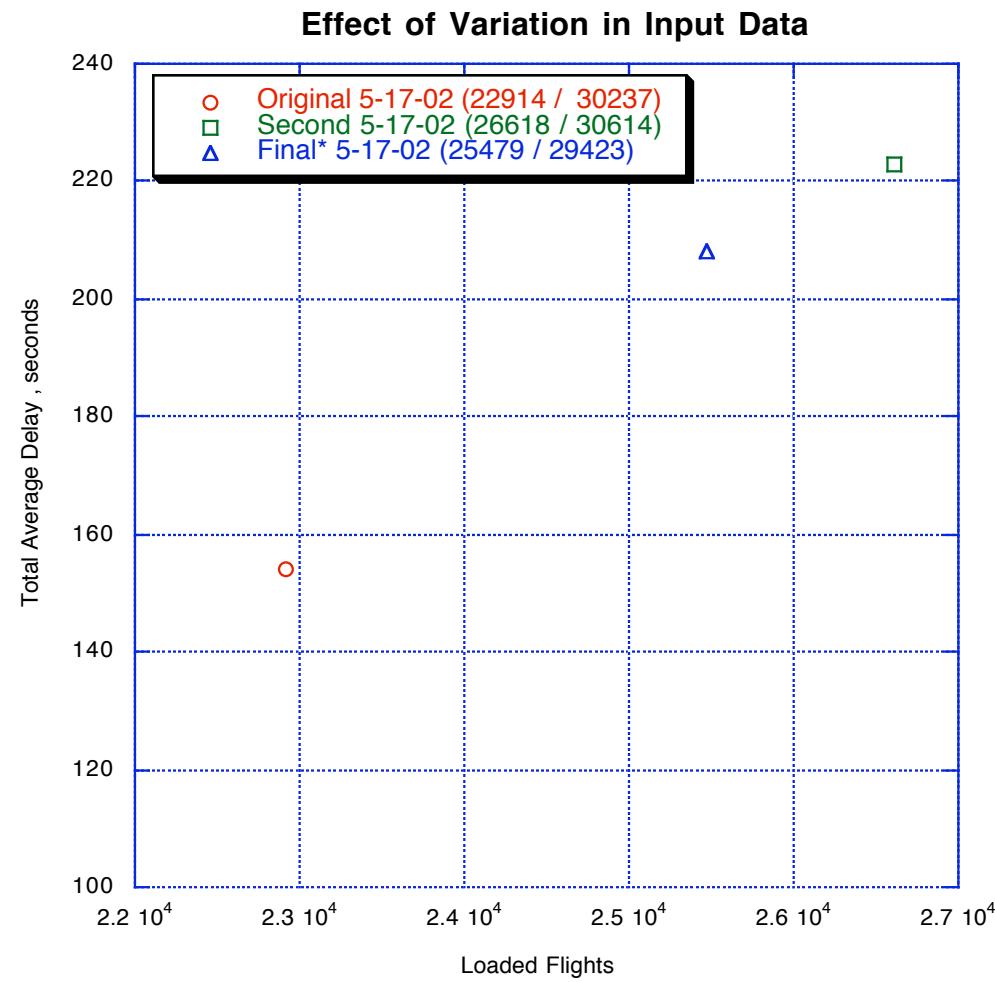


Repeatability

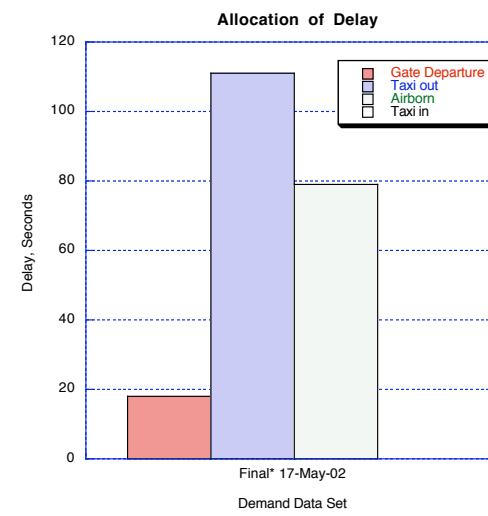
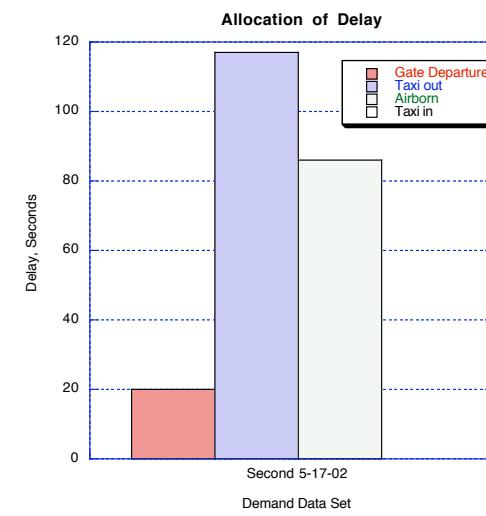
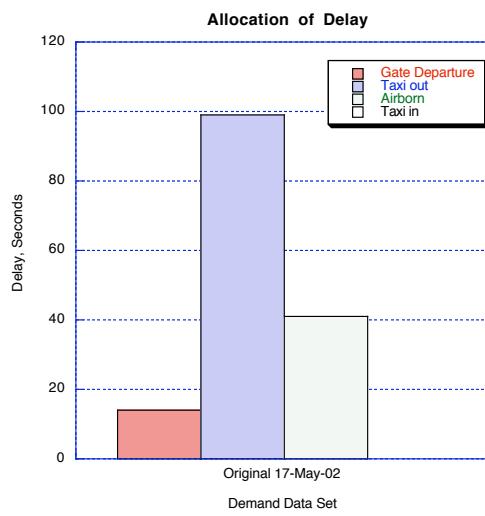
String1 to String 2 Repeatability Effects on Average Delays
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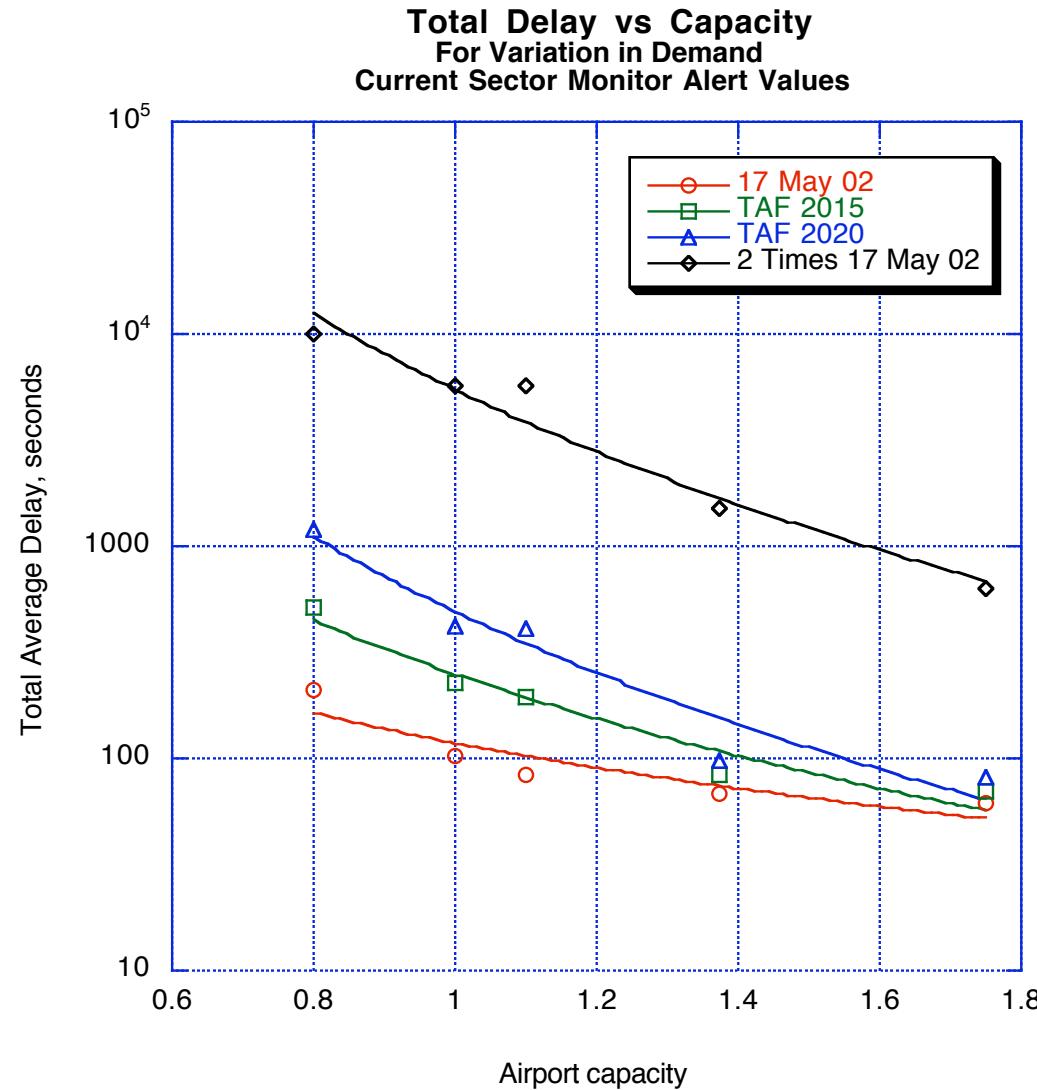
Which 17 May 2002?



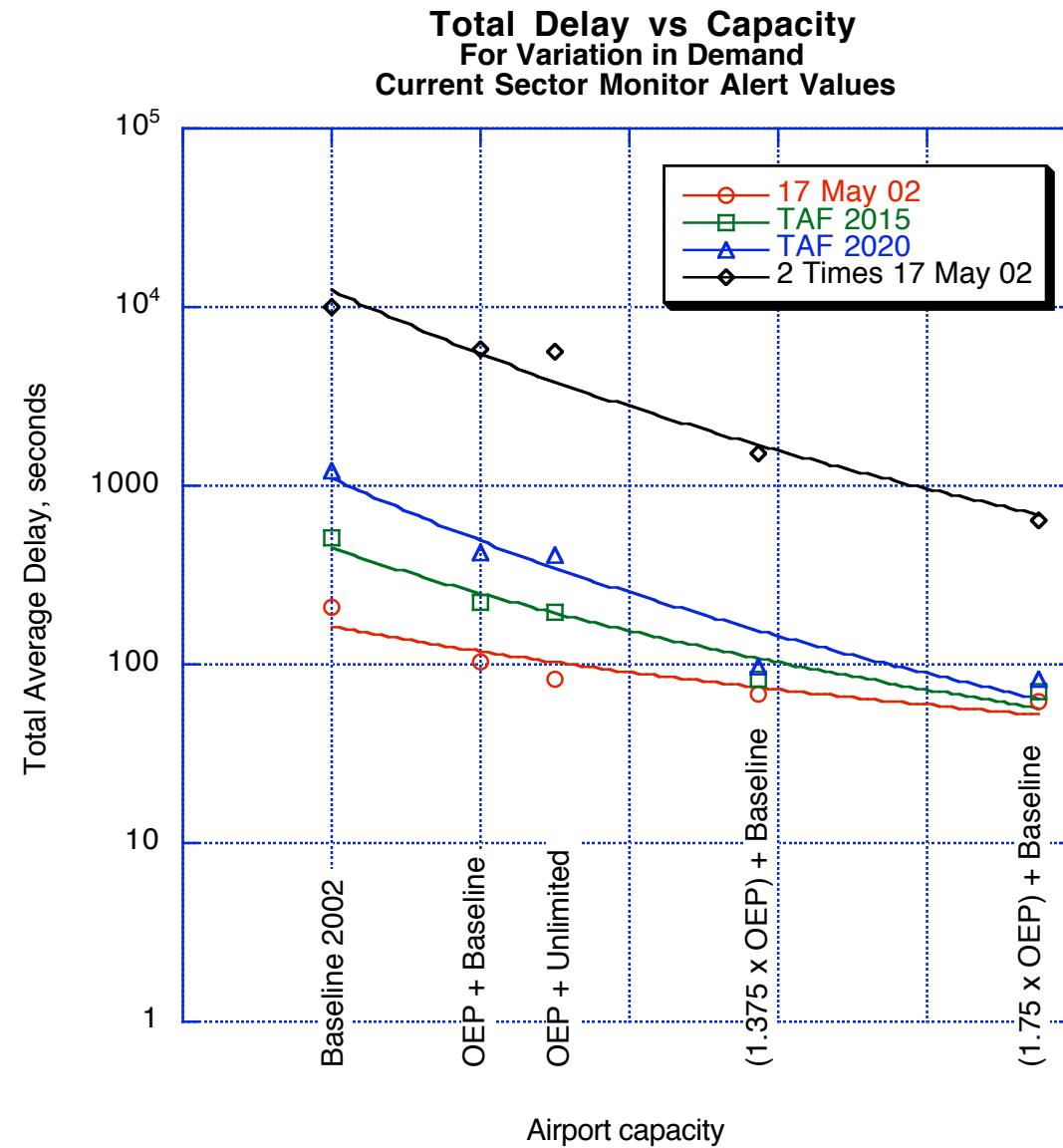
Variations of Delay for Similar Input Files



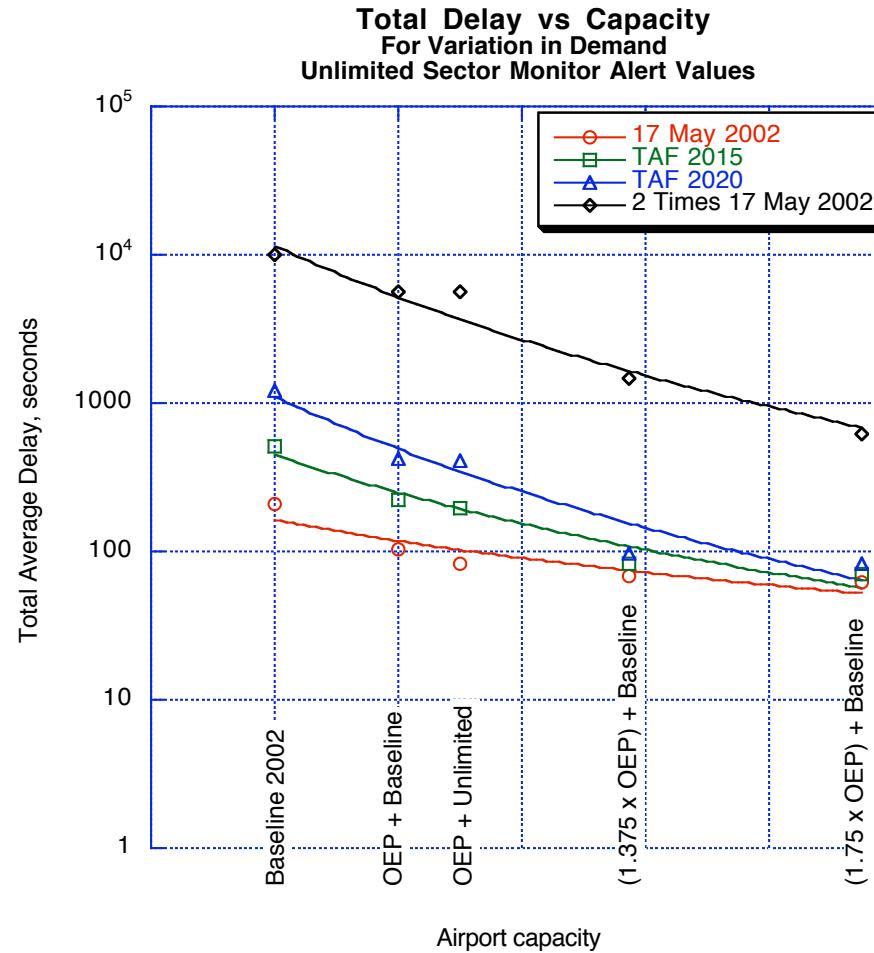
Delay vs Capacity



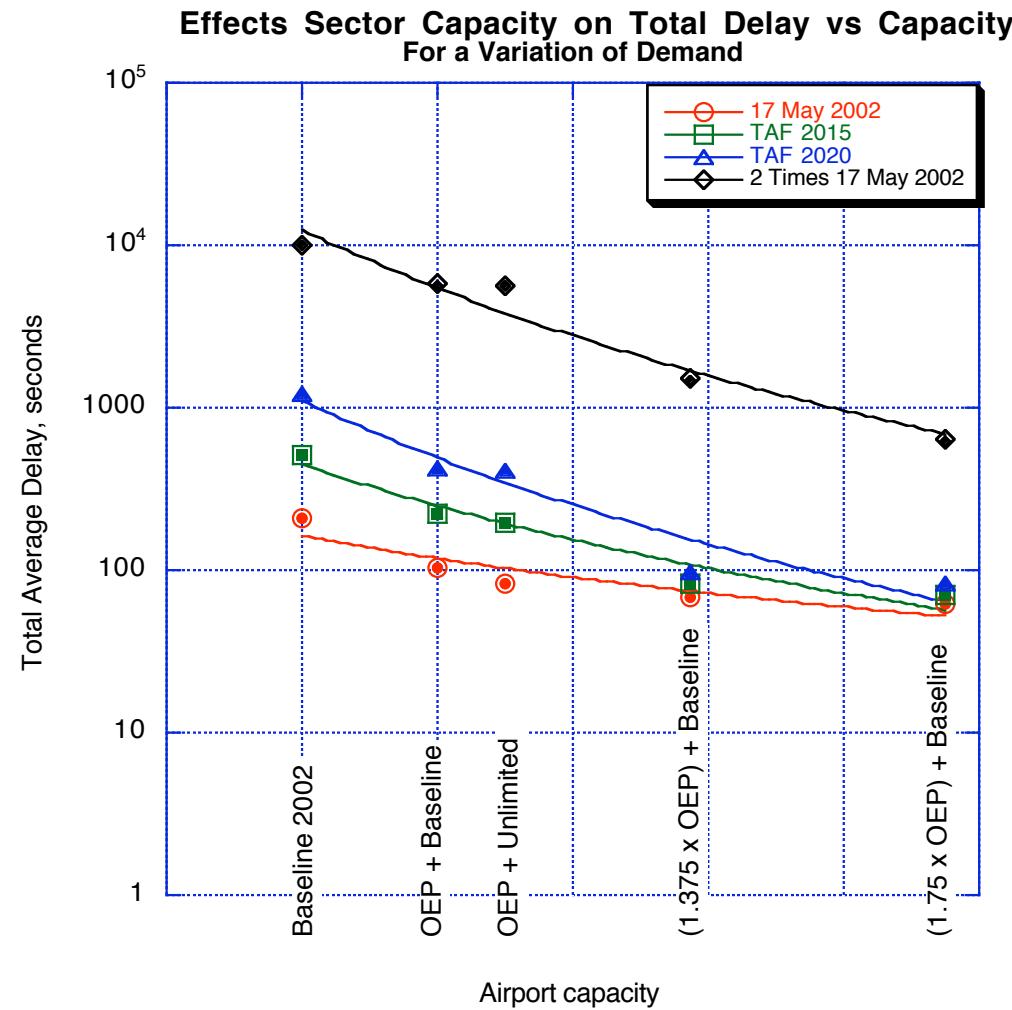
Delay vs Capacity



Delay vs Capacity

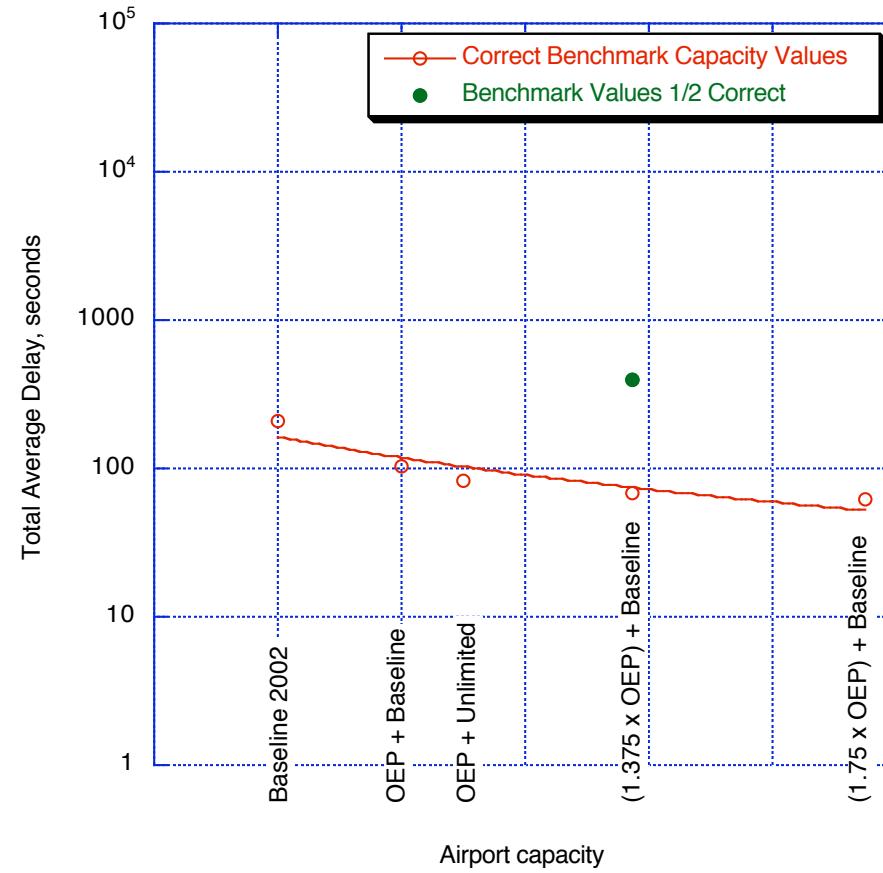


Sector Capacity Effect On Delay

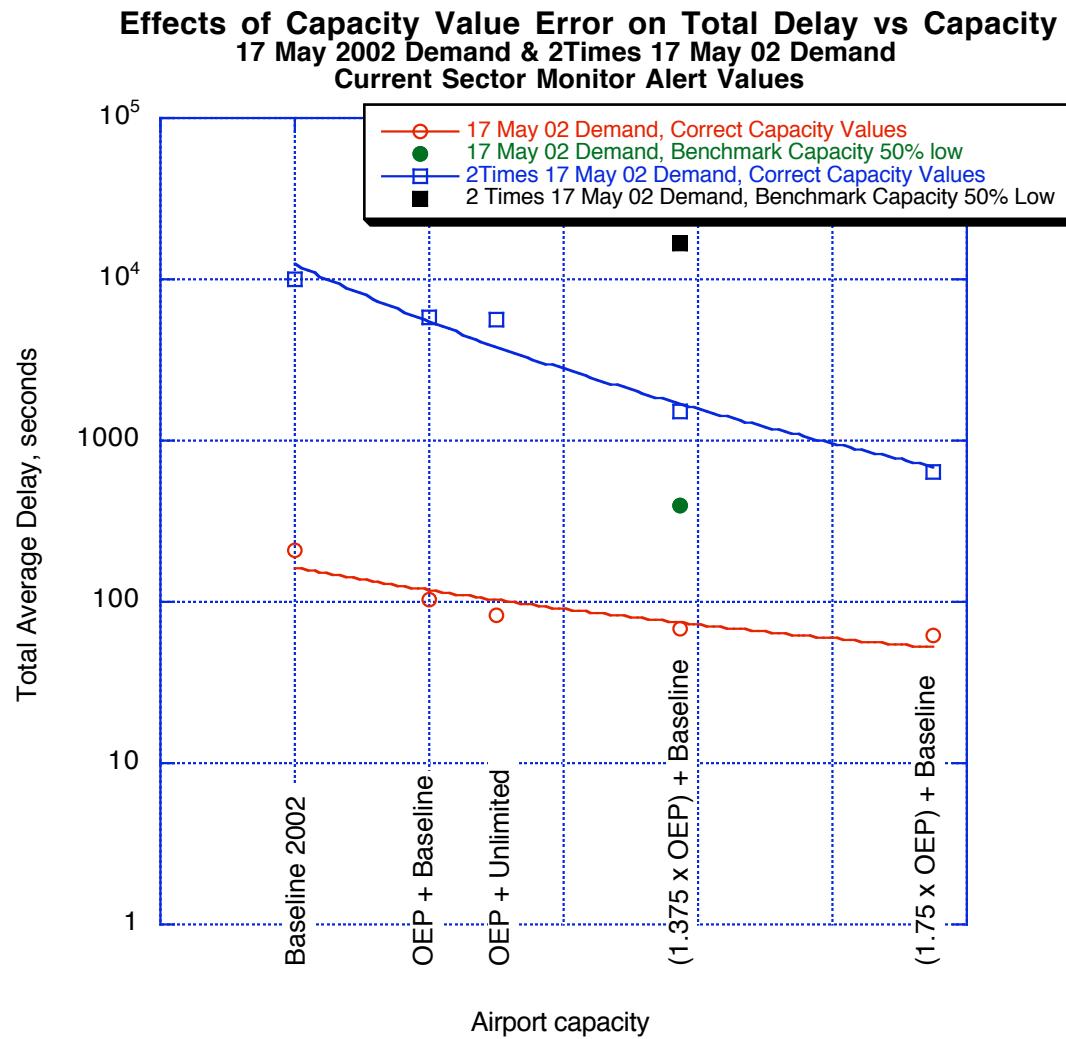


Airport Capacity Error Effects

Effects of Capacity Value Error on Total Delay vs Capacity
For 17 May 2002 Demand
Current Sector Monitor Alert Values

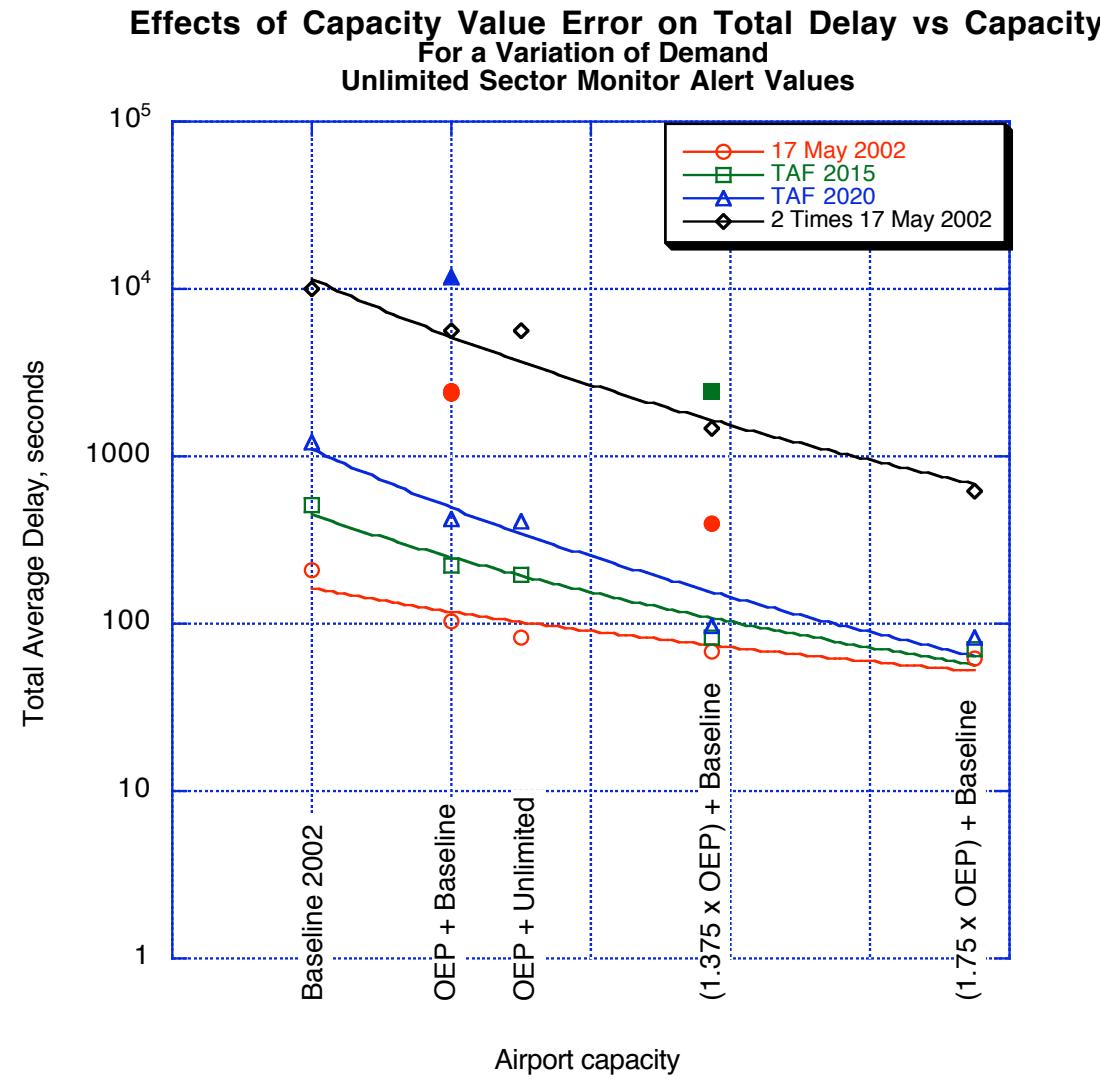


Airport Capacity Error Effects

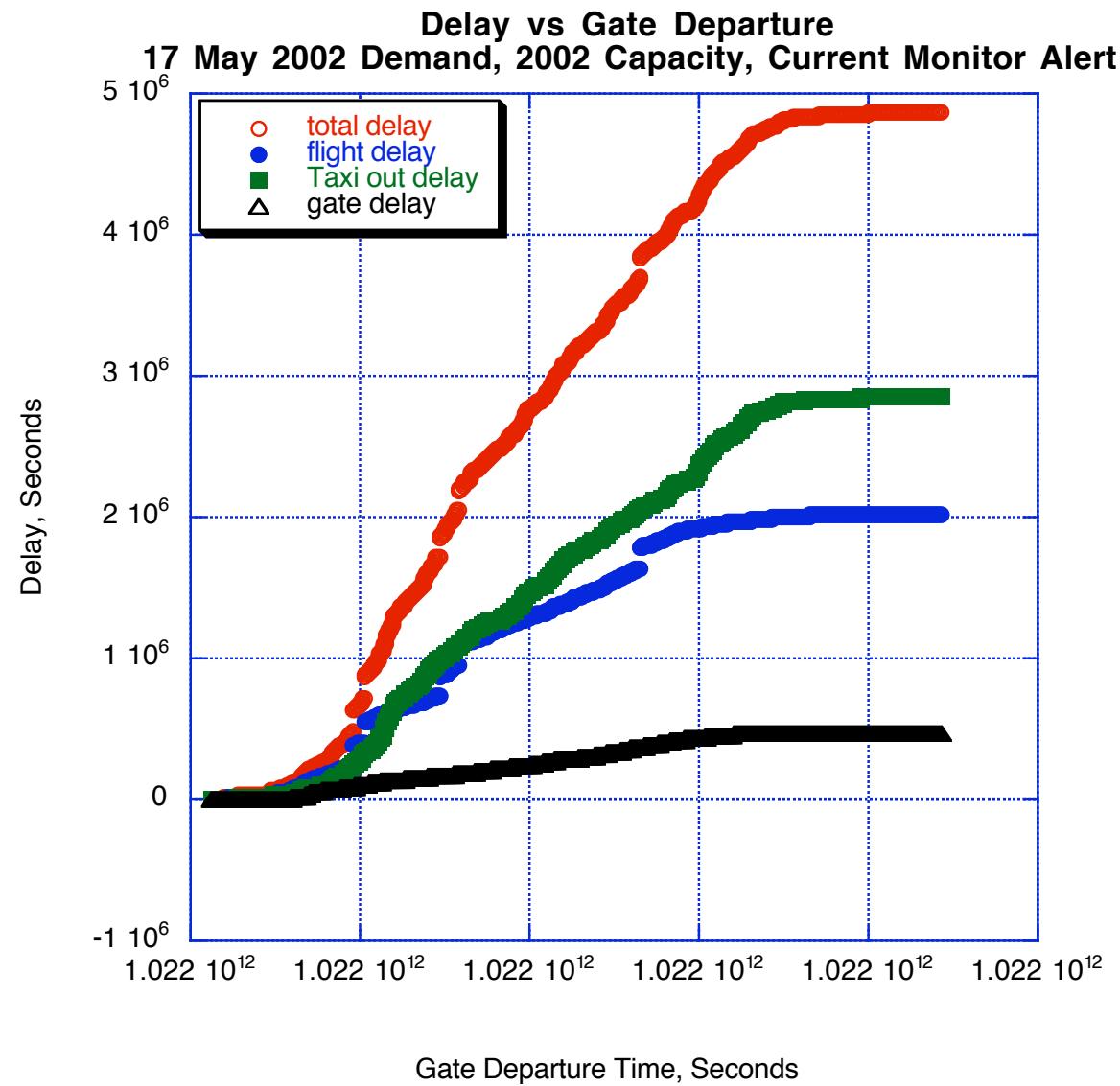


Airport Capacity Error Effects

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Delay vs Departure Time



Delay vs Departure Time

